ONTARIO MINISTRY OF ENVIRONMENT
36936000024500

1970

OPERATING SUMMARY

OWEN SOUND

water pollution control plant

TD
367
.A56
O94
1970
MOE

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ONTARIO WATER RESOURCES COMMISSION

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Division of Plant Operations

TD Owen Sound : water pollution
367 control plant.
.A56 81784
O94
1970

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

DSCaverly

D. S. Caverly,
General Manager.

DMcTavish

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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OWEN SOUND

water pollution control plant

operated for

THE CITY OF OWEN SOUND

by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY

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135 St. Clair Avenue West
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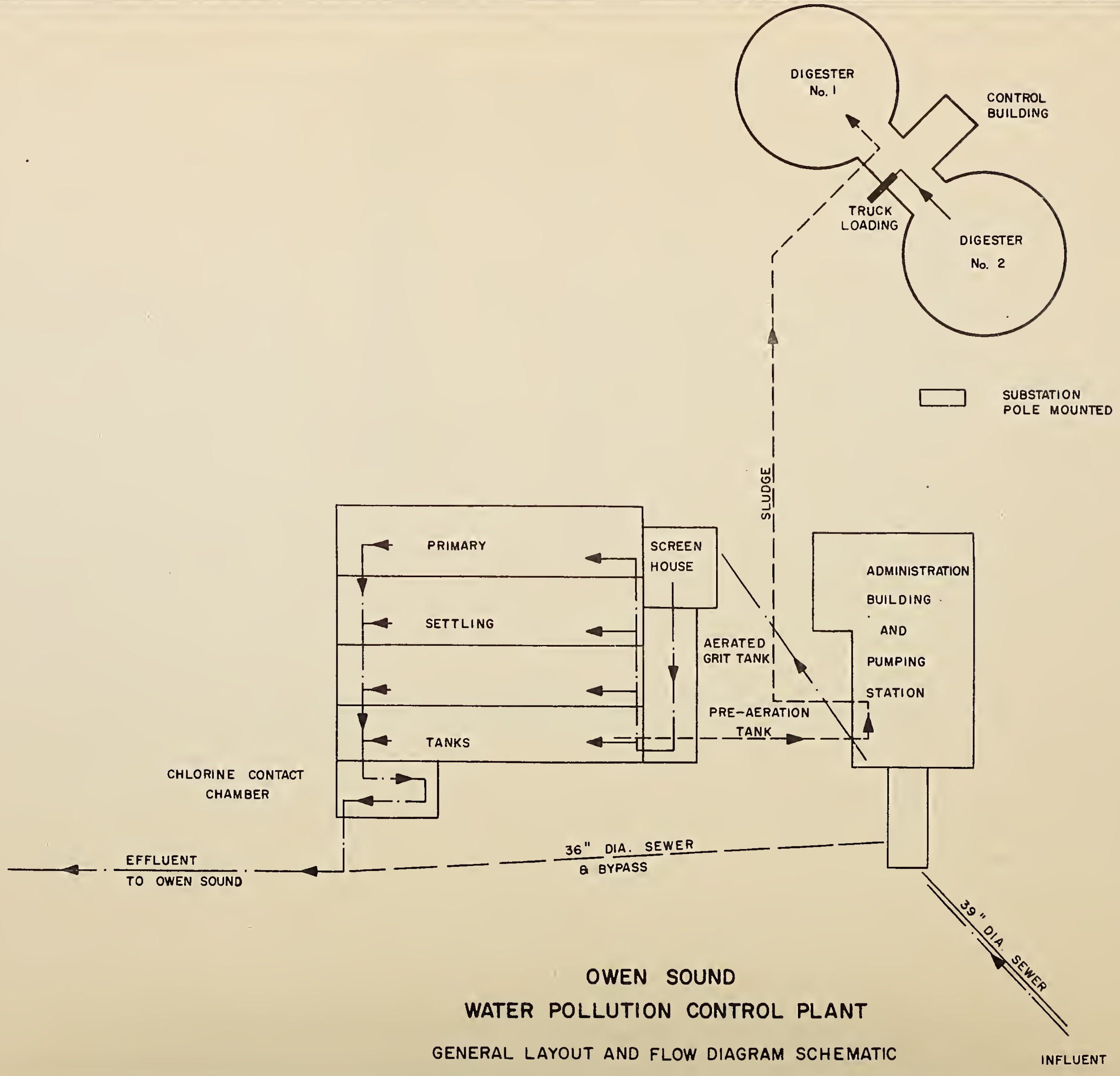


OWEN SOUND
WATER POLLUTION CONTROL PLANT
GENERAL LAYOUT AND FLOW DIAGRAM SCHEMATIC

DESIGN DATA

PROJECT NO.	2-0069-60	TREATMENT	Primary
DESIGN FLOW	3.0 mgd	DESIGN POPULATION	25,000
BOD - Raw Sewage - Removal	180 mg/l 40%	SS - Raw Sewage - Removal	200 mg/l 65%

SEWAGE PUMPING STATION

Screening

- 1 3/4" spacing

Pumps

Type: Worthington
Size: Three 3150 gpm @ 33' tdh
(One diesel standby)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C (36")

Grit Removal

Type: Aerated
Size: One $18\frac{1}{2}$ X 13 X 12' (18,000 gal)
Retention: 8.6 min

Pre-aeration Tank

Size: One 23' 9" X 13 X 12'
(23,400 gal)
Retention: 11.2 min

Air Supply

Type: Sutorbilt
Size: Two 408 scfm @ 6 psi

Primary Sedimentation

Type: Rex Linkbelt
Size: Two 78 X 32 X $12\frac{1}{2}$' (388,000 gal)
Retention: 3.11 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 8,260 gal/ft/day

CHLORINATION

Type: W & T
Size: One 2000 lb/day

Chlorine Contact Chamber

Size: One 31 X 14 X 8' (21,700 gal)
Retention: 11.2 min

OUTFALL

- 828' to Owen Sound

SLUDGE HANDLING

Digestion System - Two-stage

Primary --
Type: PFT with one Sutorbilt compressor
Size: One 40' dia x 25' swd (31,400 cu ft or 0.196 mil gal)
Loading: 2.75 lb/cu ft/mo

Secondary --
Size: One 40' dia x $24\frac{1}{2}$' swd (30,800 cu ft or 0.192 mil gal)
Total Loading: 1.88 lb/cu ft/mo

WEST SIDE PUMPING STATION

One - 3916 gpm Chicago Pump
Two - 1000 gpm Smart-Turner
Standby - Diesel generator

'70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	3.80	—	115	—
High	9.20	April	168	April
Low	1.10	August	90	August

GENERAL

Since the pumping capacity at the West Side Station was increased, the incidence of flooding on the west side has greatly reduced.

This increased pumping had the effect of increasing the percentage of the time the plant was overloaded from 80% in 1969 to 85% in 1970. The total recorded flow was approximately 1400 million gallons in 1970 and the cost of operations was $58,699.92. The unit cost of treatment was $42.00 per million gallons. It should be pointed out that the flow is frequently in excess of the meter capacity and so goes unrecorded.

PLANT FLOWS and CHLORINATION

During 1970 a total of 43,430 lbs. of chlorine was used at an average dosage of 2.4 mg/l. A minimum chlorine residual of 0.5 mg/l was maintained in the effluent.

PLANT EFFICIENCY

Although the raw sewage has a relatively low BOD (115 mg/l), it has a high suspended solids (260 mg/l) content consisting of sand and silt presumably from infiltration and surface run off.

There is a 63% reduction in BOD and an 87% reduction in suspended solids through the plant. The effluent has a BOD of 43 mg/l and a suspended solids content of 35 mg/l.

SLUDGE DIGESTION and DISPOSAL

The grit removal facilities ran at capacity and 1245 cubic feet of grit were withdrawn from the system. Unfortunately grit in quantity reaches the primary clarifiers where it is pumped to the digesters. The secondary digester had large quantities of grit removed from it in the summer of 1970.

The digesters, apart from the grit problem, operated efficiently in rendering the sludge inactive.

CONCLUSIONS

Because of the high flows and the subsequent hydraulic overload an engineering report was prepared by Gore & Storrie Limited pointing out the problems and recommending the corrections to be made. This report will be examined and discussed with the municipality in 1971. Among the recommendations made is that the plant capacity be increased from 3 to 4.5 million gallons per day.

PROJECT COSTS

2-0069-60

NET CAPITAL COST (Final)	$1,468,243.18
DEDUCT - Portion financed by CMHC/MDLB (Final)	1,027,151.39
Long Term Debt to OWRC	$ 441,091.79
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$ 92,895.25

Net Operating	$ 60,695.92
Debt Retirement	8,901.00
Reserve	7,628.53
Interest Charged	24,712.71
TOTAL	$ 101,938.16

RESERVE ACCOUNT

Balance @ January 1, 1970	$ 55,546.30
Deposited by Municipality	7,628.53
Interest Earned	3,369.28
	$ 66,544.11
Less Expenditures	12,366.88
Balance @ December 31, 1970	$ 54,177.23

PROJECT COSTS

2-0068-60

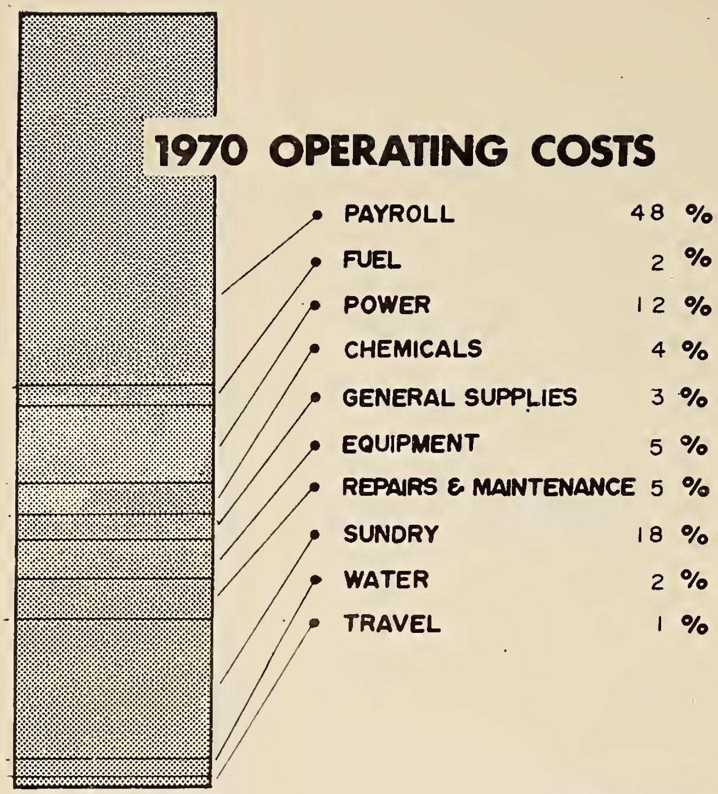
NET CAPITAL COST (Final)	$151,459.76
DEDUCT - Portion financed by CMHC/MDLB (Final)	19,000.00
Long Term Debt to OWRC	$132,459.76
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$ 32,458.92

Net Operating	$ 241.63
Debt Retirement	2,673.00
Reserve	584.52
Interest Charged	7,421.22
TOTAL	$ 10,920.37

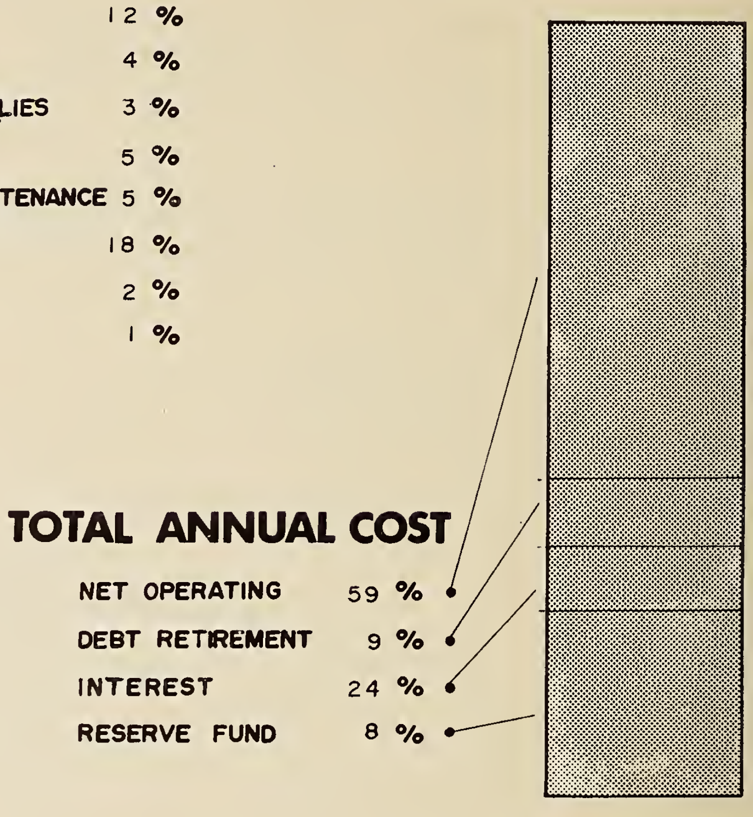
RESERVE ACCOUNT

Balance @ January 1, 1970	$ 9,484.13
Deposited by Municipality	584.52
Interest Earned	625.71
	$ 10,694.36
Less Expenditures	-
Balance @ December 31, 1970	$ 10,694.36

1970 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	1166.20	$36,736.62	$31.52	6 cents
1967	1415.50	48,655.69	34.37	3 cents
1968	1442.50	48,466.97	33.60	4 cents
1969	1475.20	53,549.66	36.30	5 cents
1970	1387.0(est.)	60,198.42	43.40	6 cents

MONTHLY OPERATING COSTS

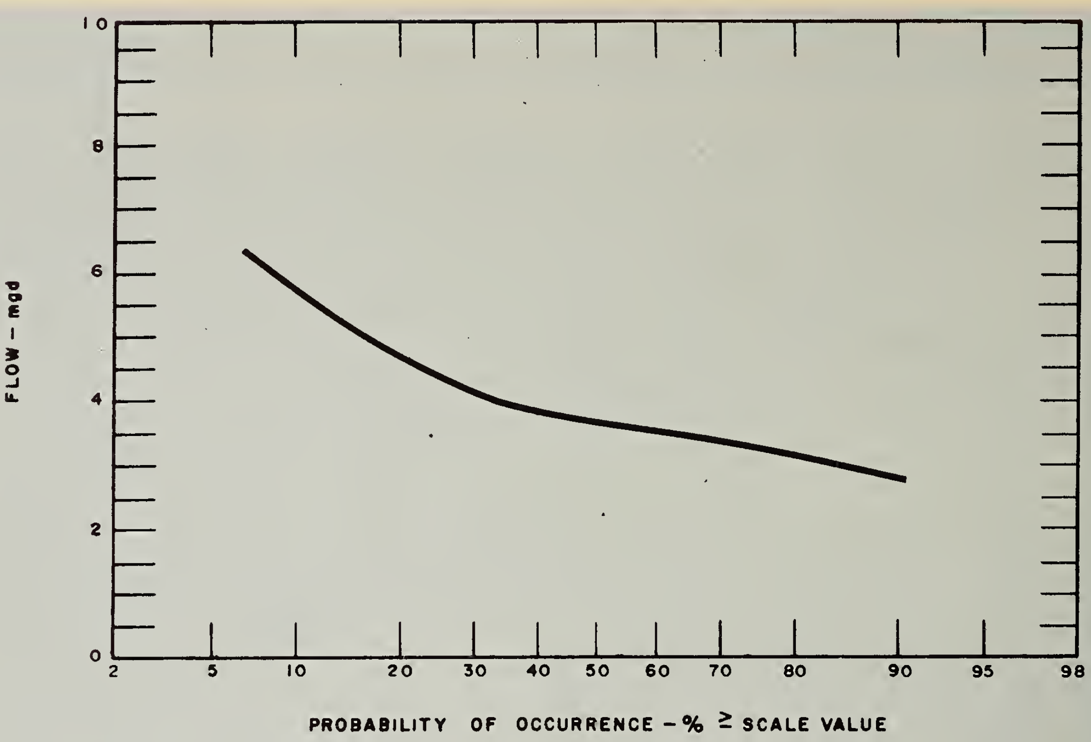
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	4026.79	3184.16	-	59.70	551.24	-	64.78	-	-	39.48	101.93	25.50
FEB	4020.28	2288.95	-	59.70	502.25	24.21	59.75	-	109.07	851.60	96.70	28.05
MAR	4785.08	2307.66	-	188.10	510.10	-	213.01	-	712.09	770.92	83.20	
APR	4041.40	2244.38	-	148.38	586.99	-	25.62	64.83	10.66	813.94	90.20	56.40
MAY	3990.10	2259.57	-	-	617.82	-	184.49	-	274.14	512.41	102.67	39.00
JUNE	4793.52	2269.46	-	210.46	494.37	-	104.59	1362.62	94.93	114.07	90.72	52.30
JULY	6827.95	2195.76	-	-	578.81	-	297.12	395.81	201.58	3019.59	110.48	28.80
AUG	6566.93	3370.14	-	-	587.54	-	116.62	-	107.42	2273.41	111.80	
SEPT	4129.50	2241.82	-	-	575.88	-	175.41	-	62.47	918.34	100.23	55.35
OCT	4994.41	2272.56	-	-	672.62	-	103.22	-	26.34	1671.20	131.80	116.67
NOV	4284.50	2234.39	-	-	586.04	-	92.76	-	352.98	859.61	122.12	36.60
DEC	7737.96	2191.74	-	326.70	1246.20	2366.70	116.39	1469.82	800.90	(1096.77)	249.38	66.90
TOTAL	60198.42	29060.54	-	993.04	7509.86	2390.91	1553.76	3293.08	2752.58	10747.80	1391.23	505.57

BRACKETS INDICATE CREDIT

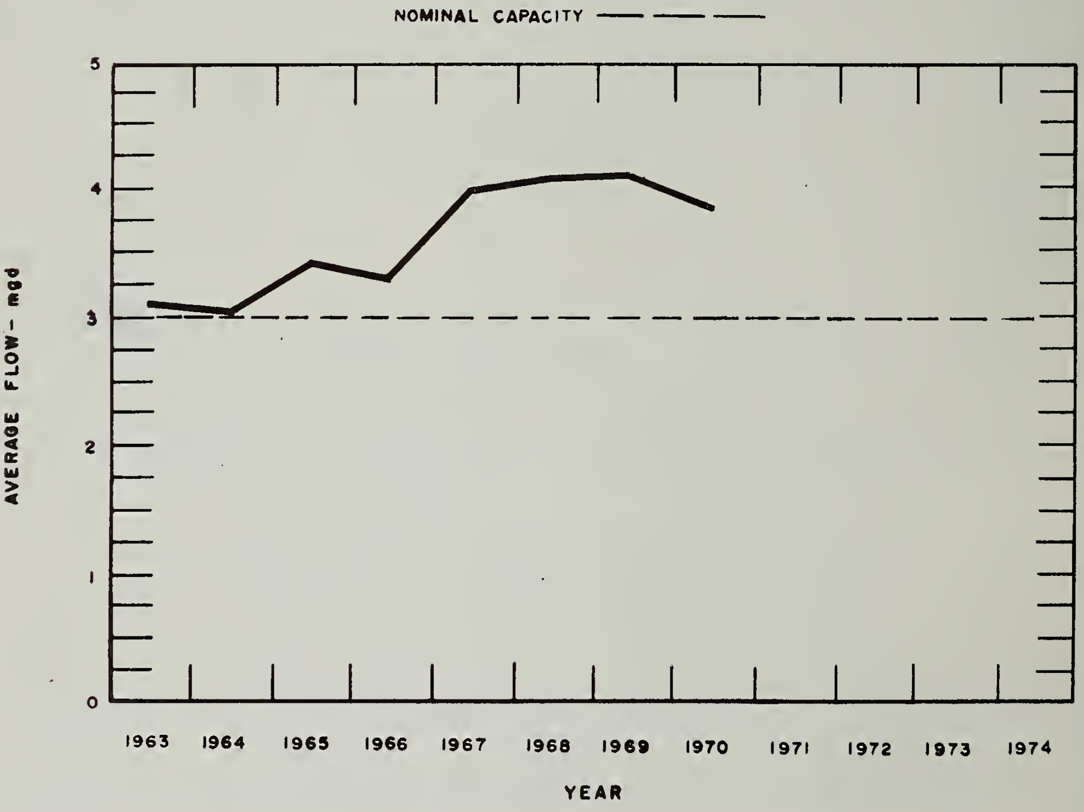
* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $12, 874.68

Note: Total does not include year-end adjustments.

PROCESS DATA



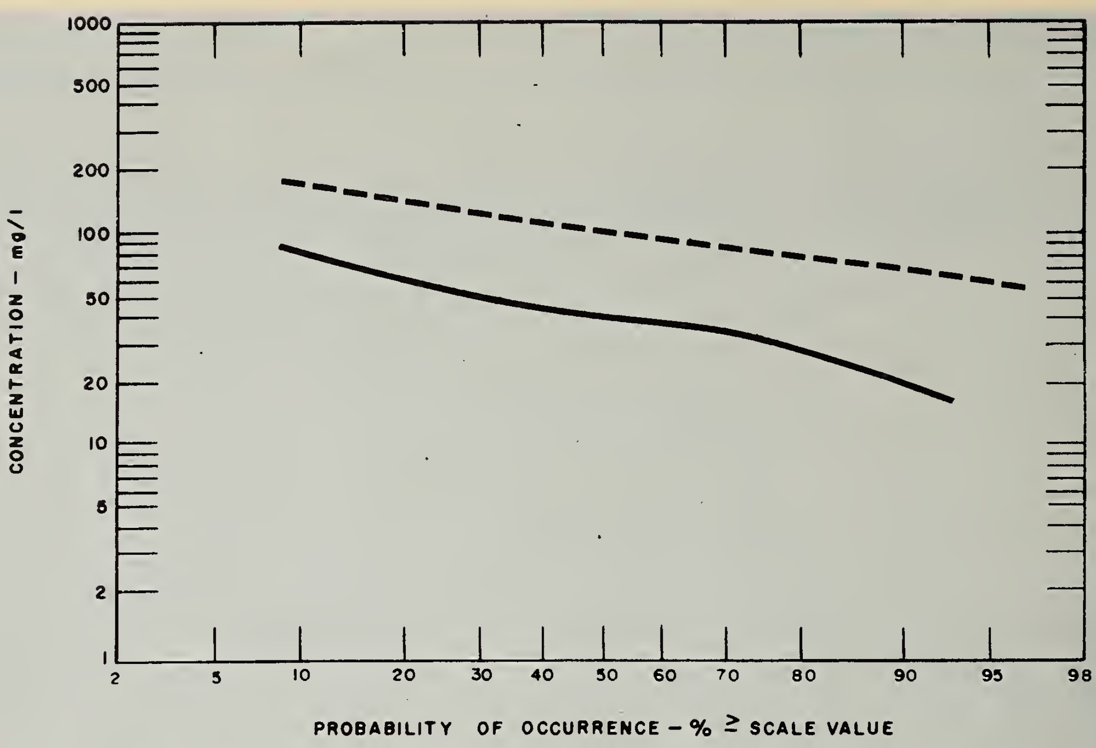
FLOWS



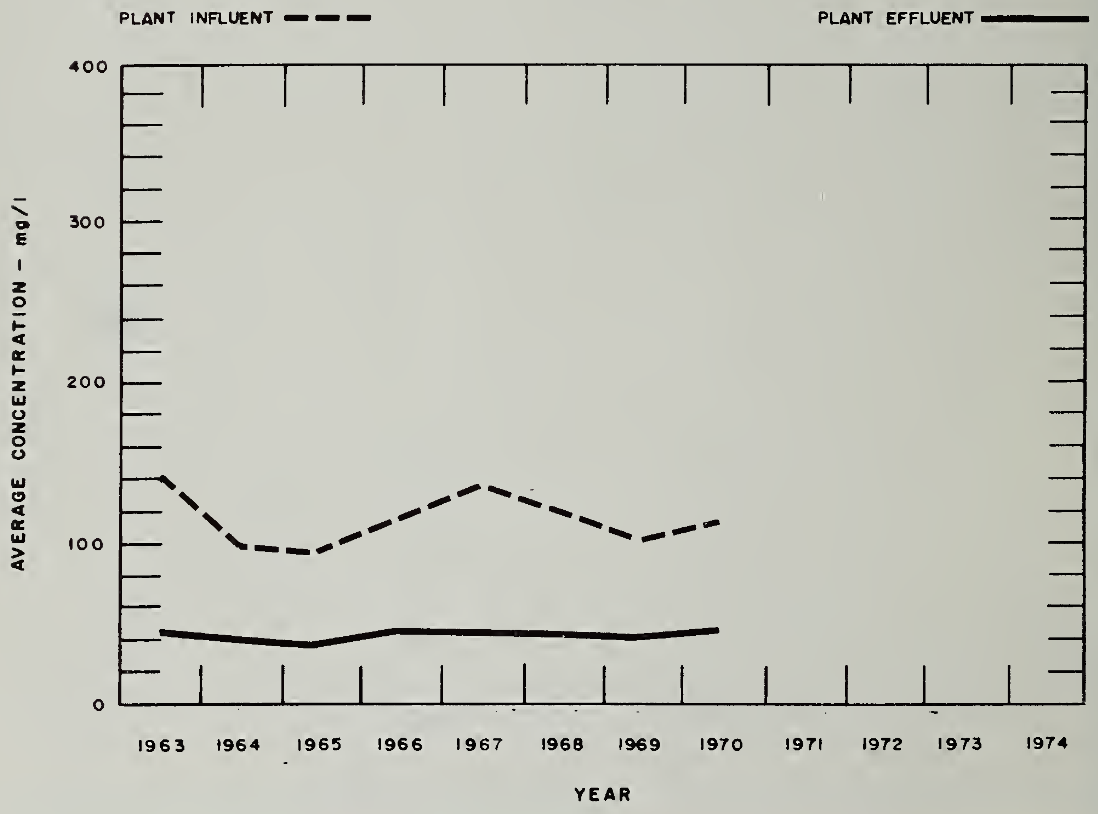
PLANT FLOWS and CHLORINATION

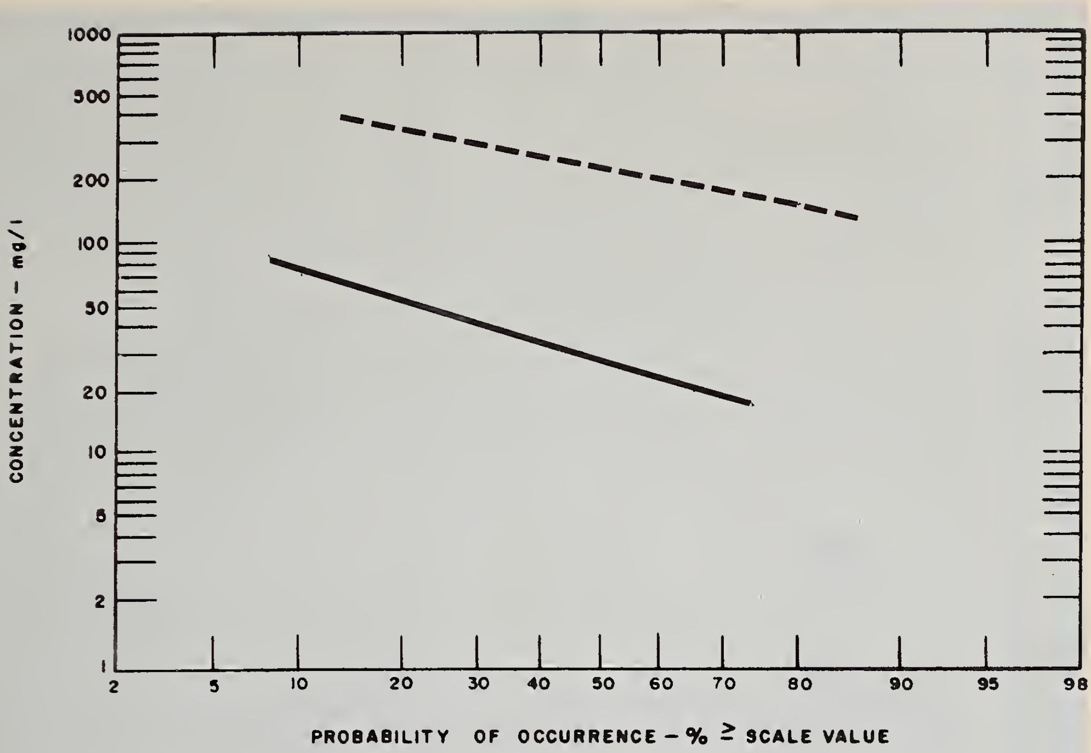
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	105	3.38	5.2	2.6	2920	0.8
FEB	94	3.35	4.7	2.5	2560	0.8
MAR	152	4.90	6.7	2.9	2660	1.7
APR	168	5.60	9.2	4.0	2920	1.7
MAY	112	3.61	4.5	2.9	2870	2.6
JUNE	91	3.00	3.6	2.8	2600	2.9
JULY	116	3.74	7.1	3.0	2790	2.4
AUG	90	2.90	3.8	1.1	3180	3.5
SEPT	104	3.46	6.0	2.9	3120	3.0
OCT	119	3.83	6.6	2.9	2510	2.7
NOV	-	-	-	-	2710	-
DEC	-	-	-	-	3500	-
TOTAL	-	-	-	-	34340	-
AVERAGE	-	3.80*	-	-	2862	2.4

*Average from 304 days - meter out of service

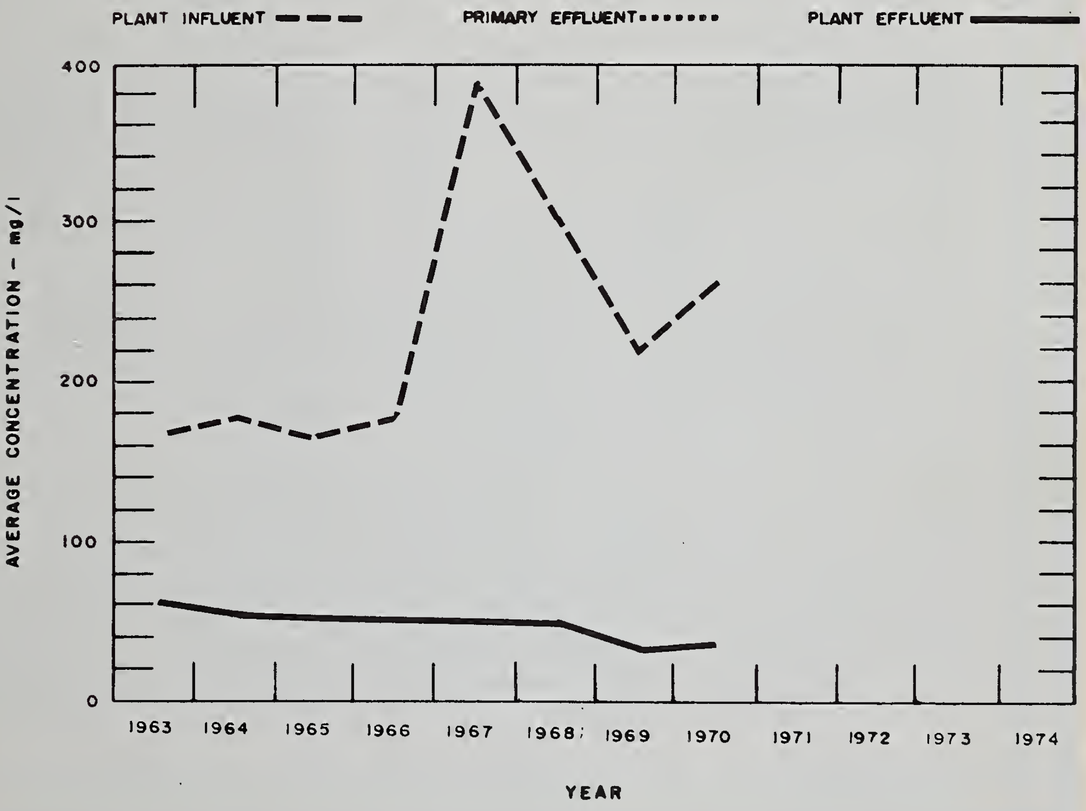


BIOCHEMICAL OXYGEN DEMAND





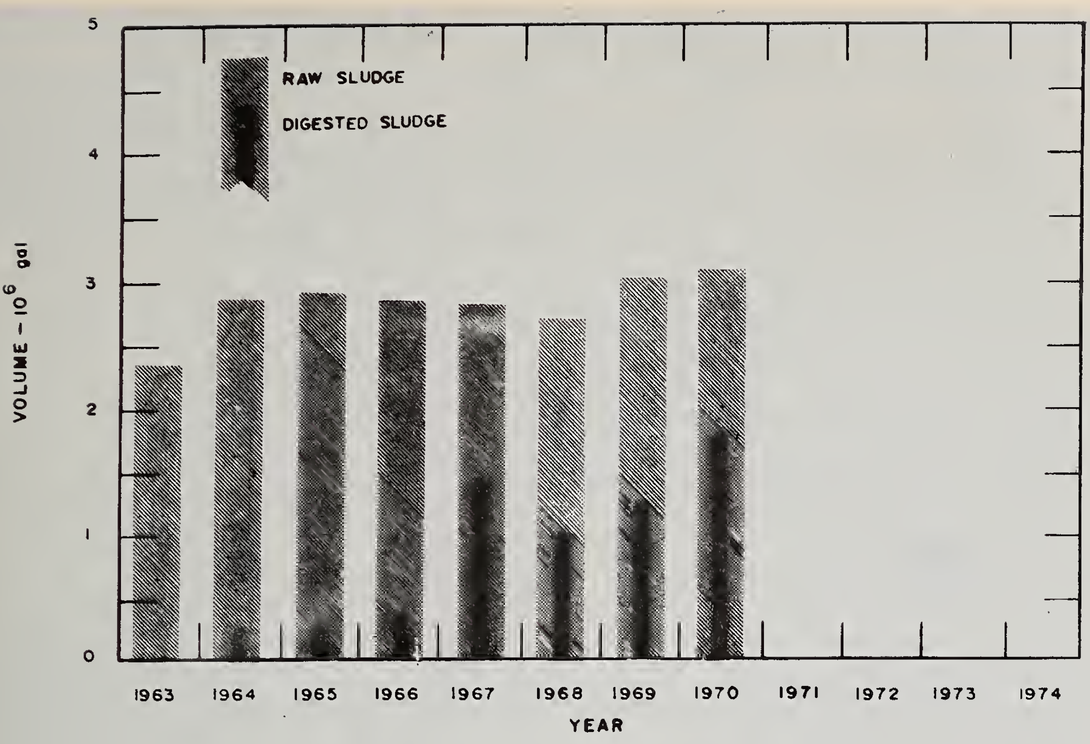
SUSPENDED SOLIDS



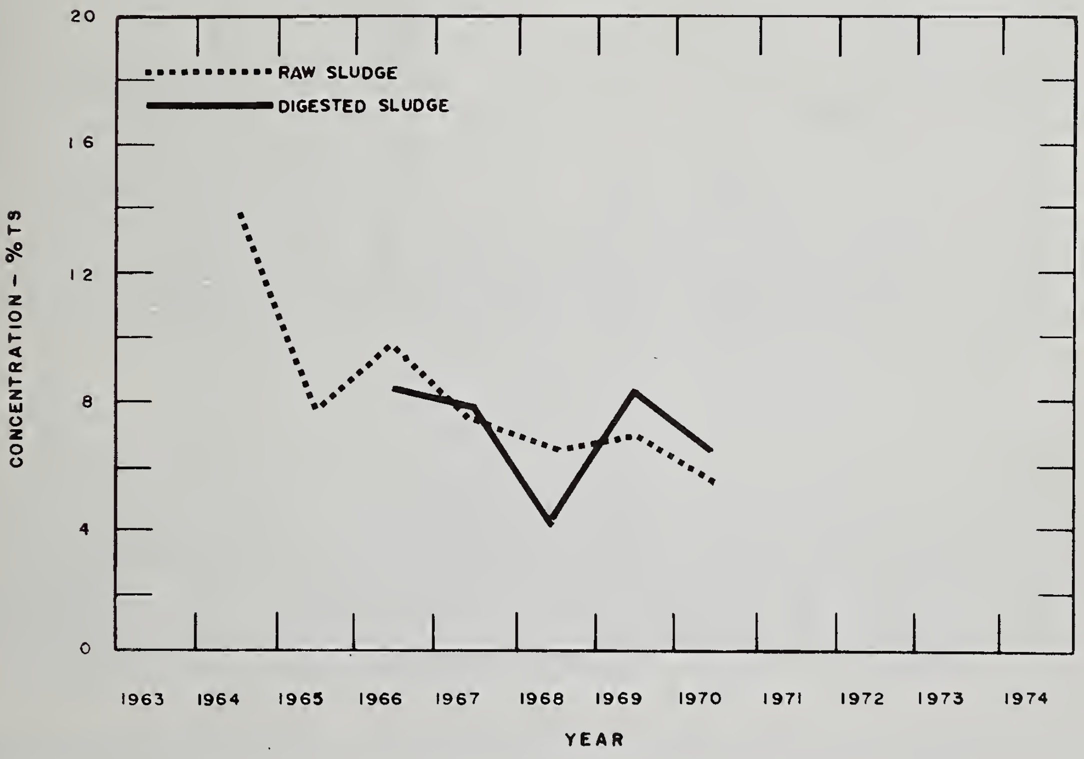
PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^5 pounds	n	mg/l	n	mg/l	%	10^5 pounds	cu ft
JAN	2	120	2	44	63	.8	6	230	6	30	87	2.1	76
FEB	2	88	2	42	52	.4	6	184	6	22	88	1.5	104
MAR	2	160	2	43	73	1.8	7	289	7	21	93	4.1	96
APR	2	60	2	38	37	.4	6	226	6	39	83	3.1	114
MAY	2	100	2	55	45	.5	6	300	6	36	88	2.9	74
JUNE	2	205	2	41	80	1.5	6	352	6	33	91	2.9	84
JULY	2	107	1	40	63	.8	7	276	6	43	84	2.7	128
AUG	4	150	4	39	74	1.0	7	315	7	52	83	2.4	96
SEPT	2	70	2	28	60	.4	6	359	6	39	89	3.3	168
OCT	2	97	2	65	33	.3	6	209	6	41	80	2.0	93
NOV	2	95	2	32	66	-	6	190	6	20	89	-	39
DEC	1	60	1	55	8	-	6	165	6	33	80	-	173
TOTAL	25	-	24	-	-	-	75	-	74	-	-	-	1245
AVERAGE	-	115	-	43	63	.8	-	260	-	35	87	2.7	103

NOTE - n is the number of samples taken


RAW SLUDGE
DIGESTED SLUDGE
VOLUME – 10^6 gal
0
1
2
3
4
5
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
CONCENTRATION – % TS
0
4
8
12
16
20
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	2.7	6.8	64	1.3	6.5	30	0	.6	-	747
FEB	2.4	5.9	45	1.2	7.9	28	0	.2	-	703
MAR	2.7	4.8	44	1.3	8.4	27	0	.4	-	783
APR	2.6	7.2	42	.5	5.4	40	0	.2	-	285
MAY	2.6	5.4	49	1.1	9.3	29	0	.2	-	623
JUNE	2.6	6.0	59	3.4	5.6	30	0	.1	-	2019
JULY	2.7	8.9	46	3.6	6.4	36	0	-	-	2155
AUG	2.6	6.1	58	1.3	4.8	27	0	-	-	747
SEPT	2.6	4.7	52	1.3	5.7	29	0	-	-	784
OCT	2.7	5.7	55	1.3	6.3	30	0	.9	-	783
NOV	2.6	4.6	53	1.1	7.9	33	0	.2	-	658
DEC	2.6	4.7	56	1.1	5.2	31	0	.2	-	665
TOTAL	31.4	-	-	18.5	-	-	0	-	-	10952
AVERAGE	2.6	5.9	52	1.5	6.7	31	0	.3	-	913

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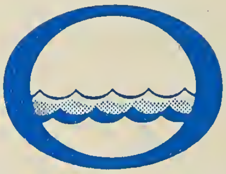

Water management in Ontario